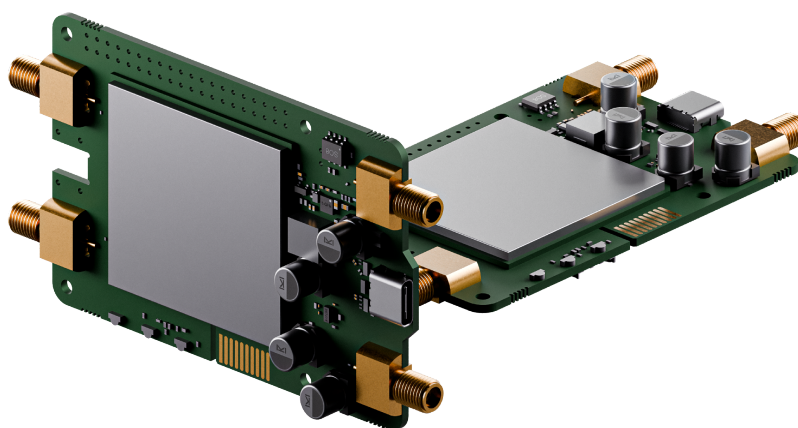




# CALYX

## Embedded Cellular Raspberry Pi HAT+



Industrial &  
automation



Energy &  
utilities



Smart city



Enterprise



Retail

### OPTIMAL FORM FACTOR

Mount seamlessly on Raspberry Pi 4/5

### GPIO MODEM CONTROL

Wake, reset, and manage the modem via Pi pins

### PCM ENHANCED AUDIO

Enable clean, low-latency audio transfer

### VERSATILE CONNECTIVITY

Choose the right option: 4G Cat 4, 5G Redcap, or full-fledge 5G

## Mobile

| Calyx 4G / EBD021 |                                                                                                                                                                                                                                   |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mobile module     | 4G LTE-FDD (Cat 4) – 75Mbps DL, 50Mbps UL; LTE-TDD (Cat 4) – 65Mbps DL, 35Mbps UL; DC-HSPA+ – 42Mbps DL, 5.76Mbps UL; 3G – 384 kbps DL, 384 kbps UL, 2G EDGE – 236.8 kbps DL, 236.8 kbps UL, 2G GPRS – 85.6 kbps DL, 85.6 kbps UL |
| 3GPP Release      | Release 9                                                                                                                                                                                                                         |

| Calyx 5G / EBD050 |                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Mobile module     | 5G Sub-6Ghz SA/NSA 2.4/3.4Gbps DL (4x4 MIMO), 900/550 Mbps UL (2x2); 4G LTE Cat 19 up to 1.6 Gbps DL/ 200 Mbps UL; 3G up to 42 DL/ 5.76 UL Mbps |
| 3GPP Release      | Release 16                                                                                                                                      |

| Calyx 5G Red Cap / EBD070 |                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------|
| Mobile module             | 5G Sub-6Ghz SA 223 Mbps DL/123 Mbps UL; 4G LTE (Cat 4) up to 195 Mbps DL/105 Mbps UL |
| 3GPP Release              | Release 17                                                                           |

## 40-pin GPIO header

|              |                                                                                                                                                  |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| PWR_KEY      | Modem turn on/off. Digital Input, 0 - 3.3 V logic level, active High, to activate use pulse (≥500 ms)                                            |
| Modem wakeup | Wake up modem from a sleep mode. Digital Input, 0 - 3.3 V logic level, active Low                                                                |
| Modem reset  | Resets the modem. Digital Input, 0 - 3.3 V logic level, active High                                                                              |
| PCM          | Digital Interface, 0 - 3.3 V logic level                                                                                                         |
| SIM_SELECT   | Used to select between SIM. Digital Input, 0 - 3.3 V logic level, SIM is selected by default, but with high logic level can be switched to eSIM. |

## Power

|                    |                                       |
|--------------------|---------------------------------------|
| USB type C         | 5 VDC                                 |
| 40-pin GPIO header | On a 40-pin header, 5 VDC and 3.3 VDC |

**Physical Interfaces**

|                                                     |                                          |
|-----------------------------------------------------|------------------------------------------|
| Status LEDs                                         | 1 x Power, NET IND, NET STAT             |
| SIM                                                 | 1 x SIM slot (Nano SIM - 4FF), push-pull |
| Power                                               | On a 40-pin header/USB power             |
| <b>Calyx 4G / EBD021; Calyx 5G Red Cap / EBD070</b> |                                          |
| Antennas                                            | 2 x SMA for Mobile                       |
| USB                                                 | USB 2.0, type C receptacle               |
| <b>Calyx 5G / EBD050</b>                            |                                          |
| Antennas                                            | 4 x SMA for Mobile                       |
| USB                                                 | USB 3.0, type C receptacle               |

**Physical Specification**

|                                                     |                            |
|-----------------------------------------------------|----------------------------|
| Weight                                              | 57 g                       |
| Mounting options                                    | With included mounting kit |
| <b>Calyx 4G / EBD021; Calyx 5G Red Cap / EBD070</b> |                            |
| Dimensions (W x H x D)                              | 56 x 23.11 x 95.48 mm      |
| <b>Calyx 5G / EBD050</b>                            |                            |
| Dimensions (W x H x D)                              | 56 x 23.11 x 100.8 mm      |

**Operating Environment**

|                       |                 |
|-----------------------|-----------------|
| Operating temperature | -40 °C to 75 °C |
|-----------------------|-----------------|

**Regulatory & Type Approvals**

|                                             |                                                     |
|---------------------------------------------|-----------------------------------------------------|
| <b>Calyx 4G / EBD021; Calyx 5G / EBD050</b> |                                                     |
| Regulatory                                  | CE, UKCA, EAC, UCRF, RCM, CB, WEEE                  |
| <b>Calyx 5G Red Cap / EBD070</b>            |                                                     |
| Regulatory                                  | CE, UKCA, EAC, UCRF, FCC, ISSED (IC), RCM, CB, WEEE |

## EMC Emissions & Immunity

| Calyx 4G / EBD021         |                                                                                                                                                                                                                                                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standards                 | EN 55032:2015+ A11:2020 + A1:2020<br>EN 55035:2017+A11:2020<br>EN 61000-3-3:2013+A1:2019+A2:2021<br>EN IEC 61000-3-2:2019+A1:2021+A2:2024<br>EN 301 489-1 V2.2.3<br>EN 301 489-17 V3.3.1<br>EN 301 489-52 V1.2.1                                                      |
| Calyx 5G / EBD050         |                                                                                                                                                                                                                                                                       |
| Standards                 | EN 55032:2015+ A11:2020 + A1:2020<br>EN 55035:2017+A11:2020<br>EN 61000-3-3:2013+A1:2019+A2:2021<br>EN IEC 61000-3-2:2019+A1:2021+A2:2024<br>EN 301 489-1 V2.2.3<br>EN 301 489-3 V2.3.2<br>EN 301 489-17 V3.3.1<br>EN 301 489-19 V2.2.1<br>EN 301 489-52 V1.2.1       |
| Calyx 5G Red Cap / EBD070 |                                                                                                                                                                                                                                                                       |
| Standards                 | EN 55032:2015+ A11:2020 + A1:2020<br>EN 55035:2017+A11:2020<br>EN 61000-3-3:2013+A1:2019+A2:2021<br>EN IEC 61000-3-2:2019+A1:2021+A2:2024<br>EN 301 489-1 V2.2.3<br>EN 301 489-17 V3.3.1<br>EN 301 489-19 V2.2.1<br>EN 301 489-52 V1.2.1<br>47 CFR Part 15, Subpart B |

## RF

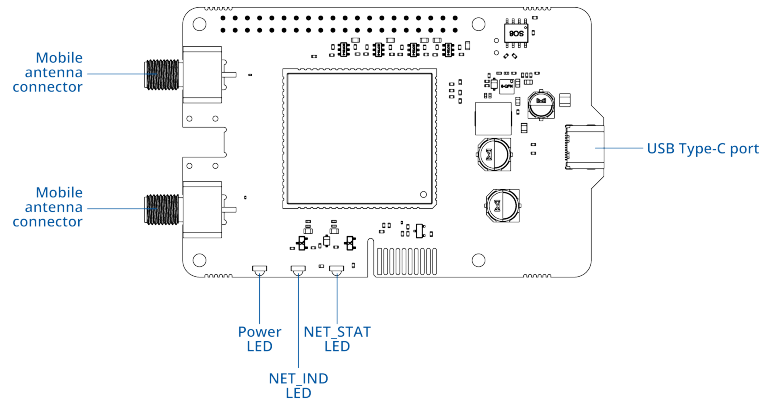
| Calyx 4G / EBD021; Calyx 5G / EBD050 |                                                                                                |
|--------------------------------------|------------------------------------------------------------------------------------------------|
| Standards                            | EN 301 908-1 V15.2.1<br>EN 301 908-2 V13.1.1<br>EN 301 908-13 V13.2.1<br>EN 301 908-25 V15.1.1 |
| Calyx 5G Red Cap / EBD070            |                                                                                                |
| Standards                            | EN 301 908-1 V15.2.1<br>EN 301 908-13 V13.2.1<br>EN 301 908-25 V15.1.1                         |

## Safety

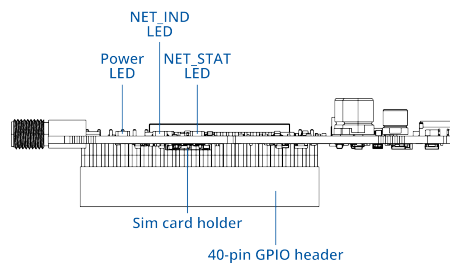
|           |                                                                                                            |
|-----------|------------------------------------------------------------------------------------------------------------|
| Standards | <b>CE:</b> EN IEC 62311:2020<br><b>RCM:</b> AS/NZS 62368.1:2022<br><b>CB:</b> EN IEC 62368-1:2020+A11:2020 |
|-----------|------------------------------------------------------------------------------------------------------------|

## EBD021 & EBD070 Hardware

### TOP VIEW

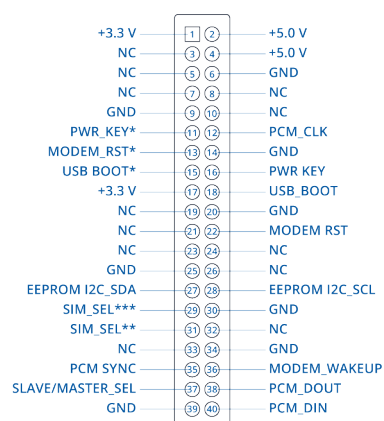


### LEFT VIEW



## GPIO Connector Pinout

### TOP VIEW



NC - Not Connected

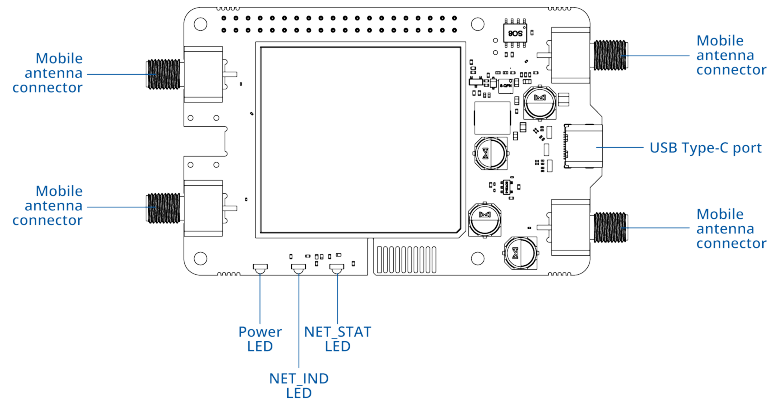
\* Alternative pin (with a different assembly)

\*\* Only in EBD021 with eSIM variant

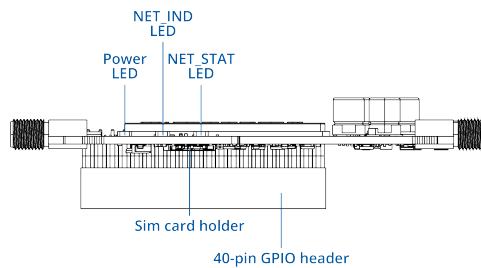
\*\*\* Alternative pin (with a different assembly), only in EBD021 with eSIM variant

## EBD050 Hardware

### TOP VIEW

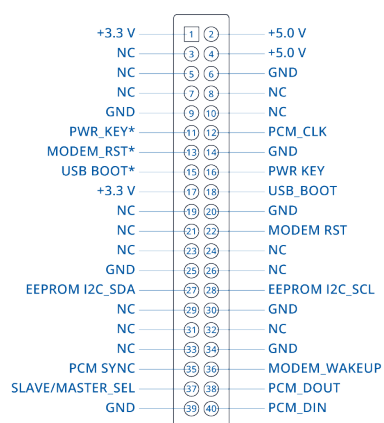


### LEFT VIEW



## GPIO Connector Pinout

### TOP VIEW

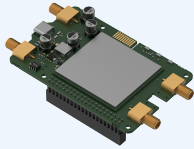


NC - Not Connected

\* Alternative pin (with a different assembly)

## Ordering

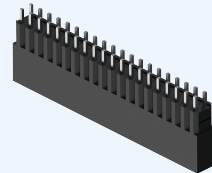
Standard package\*



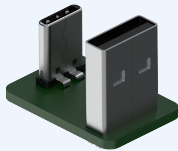
CALYX



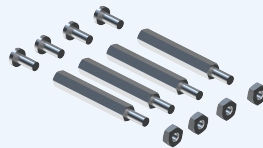
QUICK START GUIDE



PCB CONNECTOR



USB TYPE-C TO  
USB TYPE-A ACCESSORY



FASTENERS KIT

\*Standard package contents may differ based on standard order codes.

For more information on all available packaging options – please [contact us](#) directly.

## Classification codes

**HS Code:** 851762

**HTS:** 8517.62.00

### Available versions

|                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                     |                                                |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| EBD021 <b>0*****</b><br>EMEA <sup>1</sup> , Thailand,<br>Australia, New<br>Zealand<br><b>Calyx 4G / EBD021</b> | <b>4G (LTE-FDD):</b> B1, B3, B5, B7, B8, B20, B28<br><b>4G (LTE-TDD):</b> B38, B40, B41<br><b>3G:</b> B1, B8<br><b>2G:</b> B3, B8                                                                                                                                                                                                                                   | EBD021000000 / Standard<br>package without PSU |
| EBD050 <b>0*****</b><br>EMEA <sup>1</sup> , APAC,<br>Brazil<br><b>Calyx 5G / EBD050</b>                        | <b>5G NR(SA/NSA):</b> n1, n3, n5, n7, n8, n20, n28,<br>n38, n40, n41, n71, n75, n76, n77, n78<br><b>4G (LTE-FDD):</b> B1, B3, B5, B7, B8, B20, B28,<br>B32, B71<br><b>4G (LTE-TDD):</b> B38, B40, B41, B42, B43<br><b>3G:</b> B1, B5, B8                                                                                                                            | EBD050000000 / Standard<br>package without PSU |
| EBD050 <b>1*****</b><br>North America<br><b>Calyx 5G / EBD050</b>                                              | <b>5G NR NSA:</b> n2, n5, n7, n12, n13, n14, n25, n26,<br>n29, n30, n38, n41, n48, n66, n70, n71, n77, n78<br><b>5G NR SA:</b> n2, n5, n7, n12, n13, n14, n25, n26,<br>n29, n30, n38, n41, n48, n66, n70, n71, n77, n78<br><b>4G (LTE-FDD):</b> B2, B4, B5, B7, B12, B13, B14, B17,<br>B25, B26, B29, B30, B66, B71<br><b>4G (LTE-TDD):</b> B38, B41, B42, B43, B48 | EBD050100000 / Standard<br>package without PSU |
| EBD070 <b>0*****</b><br>Global <sup>1</sup><br><b>Calyx 5G Red Cap / EBD070</b>                                | <b>5G NR SA:</b> n1, n2, n3, n5, n7, n8, n12, n13, n14,<br>n18, n20, n25, n26, n28, n30, n38, n40, n41,<br>n48, n66,<br>n70, n71, n77, n78, n79<br><b>4G (LTE-FDD):</b> B1, B2, B3, B4, B5, B7, B8, B12,<br>B13, B14, B17, B18, B19, B20, B25, B26, B28, B30,<br>B66,<br>B70, B71<br><b>4G (LTE-TDD):</b> B34, B38, B39, B40, B41, B42,<br>B43, B48                 | EBD070000000 / Standard<br>package without PSU |

## Calyx spatial measurements

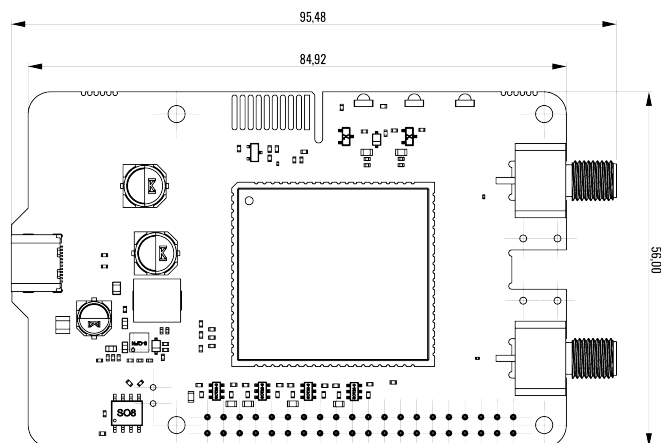
### Available versions

|                                      |                       |
|--------------------------------------|-----------------------|
| EBD021 EBD070 device<br>measurements | 56 x 23.11 x 95.48 mm |
| EBD050 device<br>measurements        | 56 x 23.11 x 108 mm   |
| Box (W x H x D):                     | 102 x 31 x 102 mm     |

## EBD021 & EBD070

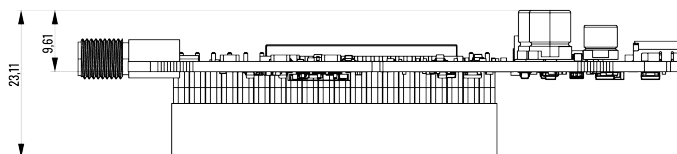
### TOP VIEW

The figure below depicts the measurements of device and its components as seen from the top:



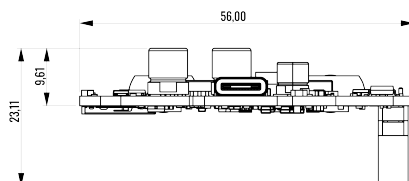
### LEFT VIEW

The figure below depicts the measurements of device and its components as seen from the left side:



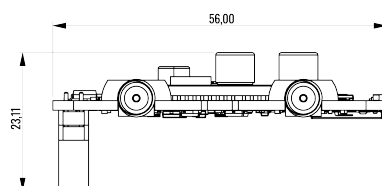
### FRONT VIEW

The figure below depicts the measurements of device and its components as seen from the front side:



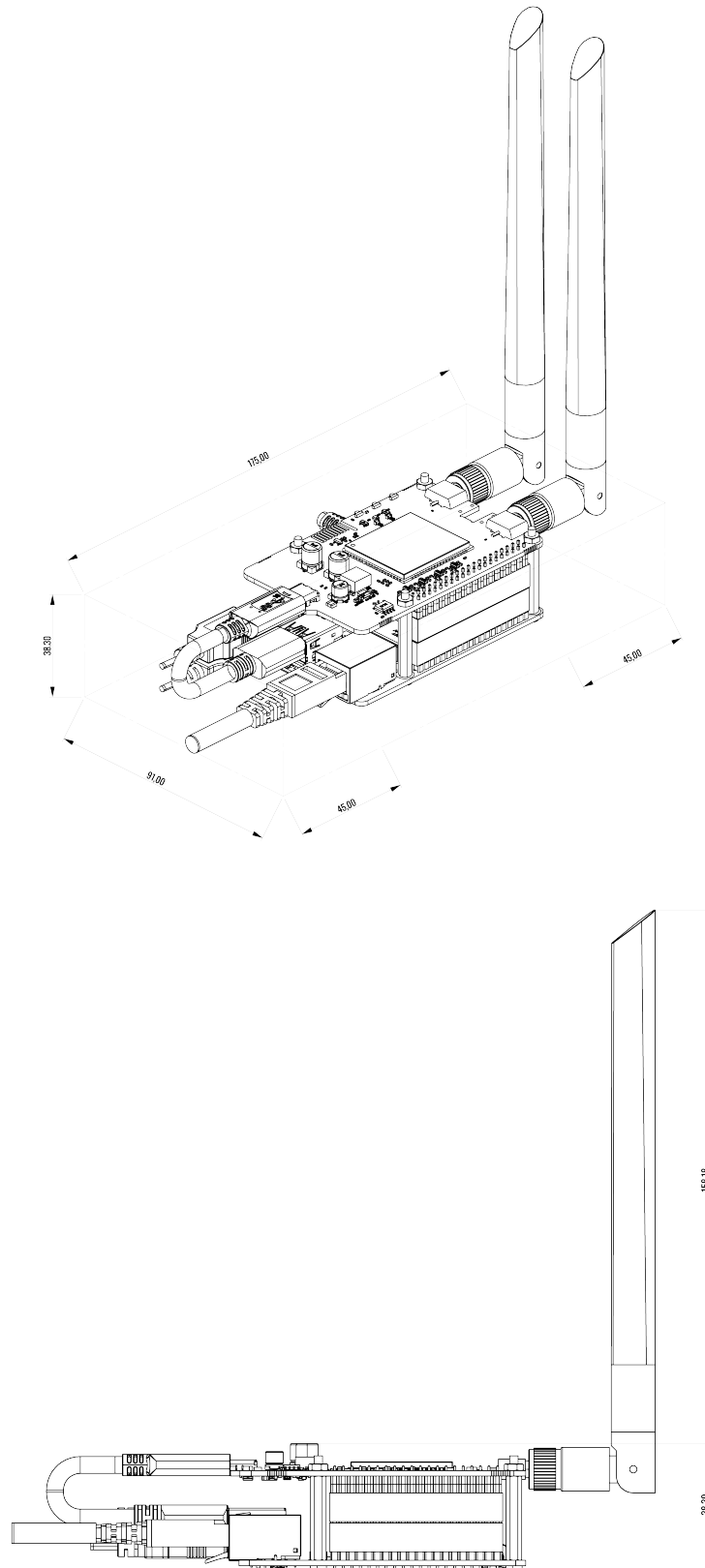
### REAR VIEW

The figure below depicts the measurements of device and its components as seen from the rear side:



## MOUNTING SPACE REQUIREMENTS

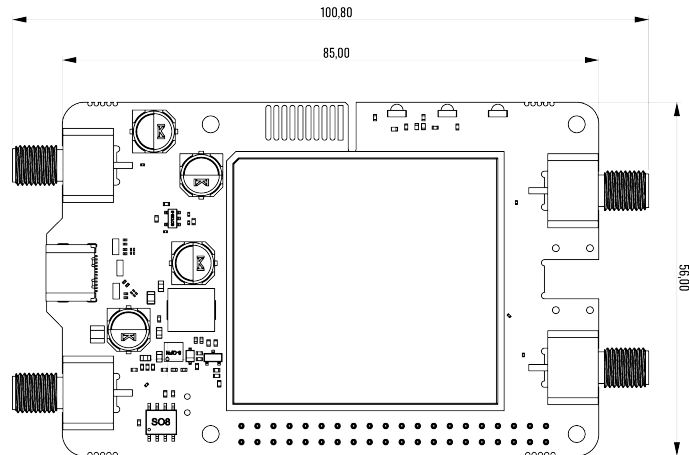
The figure below depicts an approximation of the device's dimensions when cables and antennas are attached:



## EBD050

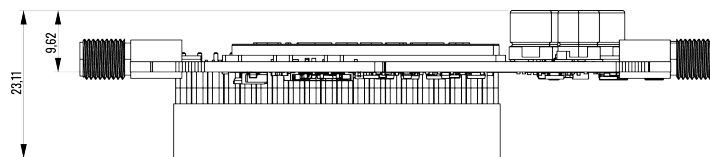
### TOP VIEW

The figure below depicts the measurements of device and its components as seen from the top:



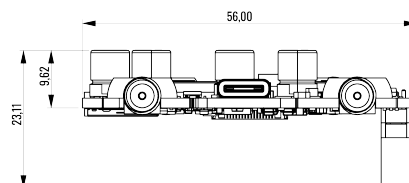
### LEFT VIEW

The figure below depicts the measurements of device and its components as seen from the left side:



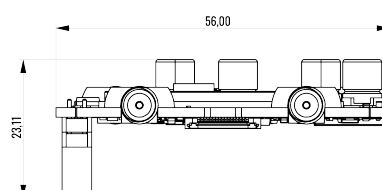
### FRONT VIEW

The figure below depicts the measurements of device and its components as seen from the front side:



### REAR VIEW

The figure below depicts the measurements of device and its components as seen from the rear side:



## MOUNTING SPACE REQUIREMENTS

The figure below depicts an approximation of the device's dimensions when cables and antennas are attached:

